REMARKS

Claim 11 and 13 are pending.
Claim 13 is amended.
Claims 11 and 13 are pending.

Amended Claim 13

Claim 13 is amended to depend from claim 11 and to replace the phrase "liquid medium" with the term "solvent". Basis for this amendment may be found on page 11, lines 29 to 31 of the present application.

35 USC 103(a)

Claims 11 and 13 are rejected under 35 USC 103(a) as being unpatentable over Holland, US 4,999,869 in view of Kraemer, US 4,039,413.

The examiner considers that Holland describes graft copolymers based on polyalkylene oxides for use as pre-treatments for textiles and in which the pretreatment is described as having soil release properties. The polyalkylene oxide graft copolymer is obtained by free radical polymerisation in the presence of a grafting monomer and polymerisation initiator added followed by polymerising. According to the teaching of Holland the polymerisation grafting is done by traditional methods such as organic peroxides. The examiner acknowledges that Holland does not disclose the addition of a type II photoinitiator.

Examiner uses Kraemer to provide missing type II photoinitiator.

Examiner also believes Holland and Kraemer are analogous art because they are from the same filed of endeavor, that is the art of graft modifying carrier substrates with ethylenically unsaturated compounds.

The examiner however is literally incorrect in this statement because Kraemer only grafts macromolecular compounds i.e. polypeptides and proteins to a macromolecular substrate and does not disclose the grafting of monomeric species (ethylenically unsaturated compounds).

Kraemer does, however, teach that it can be desirable to employ polymeric carriers containing ethylenically unsaturated groups. Example 28 of Kraemer describes the synthesis of cross linked acrylamide copolymer with glycidyl acrylate which is reacted with allyl amine so that the epoxy groups of the glycidyl acrylate units produce pendant allyl units. In this case Kraemer suggests that polymerisable groups are desirable on the carrier molecule in order to improve the chance of graft reactions. Nevertheless the species that are being grafted are polymeric and not ethylenically unsaturated monomers.

In fact Kraemer teaches away from the grafting of monomeric substances. Kraemer emphasises that in a photochemical reaction the reaction of macromolecular partners proceeds more completely than does the reaction of polypeptides with low molecular weight compounds (see column 3, lines 18 to 22). Although Kraemer does not specifically state the low molecular weight compounds are monomers the skilled person would understand that according to Kraemer it would be undesirable to photochemically graft ethylenically unsaturated monomers or any other low molecular weight compounds.

The examiner asserts that the skilled person would have used the alternative method of curing using a photosensitiser as taught by Kraemer in the grafting method of Holland and that the motivation would have been an expectation of stopping the polymerisation on command and/or a reasonable expectation of faster curing time. While

Firstly, the statement that after the light source is extinguished, the reaction is immediately ended is not an indication of faster curing time. In fact the opening sentence of the last paragraph in column 10 of Kraemer teaches that the period of irradiation depends on the strength of the radiation source and the efficacy of the photosensitiser. Hence Kraemer does not teach that a type II photoinitiator would be faster than conventional methods of polymerisation as taught by Holland.

Secondly. the statement that upon extinguishing the light source the reaction is immediately ended is not stated with any specificity as being solely applicable to type II photoinitiators; Kraemer includes compounds other than type II photoinitiators as referred to below. In fact, it is moot whether this

would lead the skilled person to consider the reaction of Kraemer to be a more controllable than conventional initiation. In column 8, lines 11 to 23 Kraemer explains what is meant by the term "photosensitisation" and furthermore in the passage at line 19 to 23 Kraemer reveals that the lowest triplet state to which the photoinitiator molecule is converted is relatively long-lived and therefore in a condition to convert other molecules into the triplet state by diffusion and therefore creating a situation where these other molecules can react as free radicals. Clearly the removal of the energy source would evidently not immediately stop the reaction from continuing.

Although Kraemer does indeed refer to several type II photoinitiators for carrying out the grafting reaction of the two macromolecules, not all of the compounds listed in column 9 or exemplified are in fact type II photoinitiators. For instance ethyl phenyl glyoxylate is a type I photoinitiator.

Applicants attach the **(item 1)** index page from the book volume III, Photoinitiators for Free Radical Cationic and Anionic Photo-polymerisation, Second Edition, Chemistry and Technology of UV and EB Formulation for Coatings, Inks & Paints by Prof. J. V. Crivello and Dr. K. Dietliker giving a breakdown of type II photoinitiators. The same reference teaches that phenylglyoxalates are discussed under the section of Type I photoinitiators (page 186) .

Also attached is page 186 **(item 2)** of the same reference which discusses phenyl glyoxylates in the context of unimolecular UV photoinitiator systems (type I photoinitiators). Incidentally the reference to Norrish type II reaction in inert solvents should not be confused with a type II photoinitiator since the two have completely different meanings. Norrish type II mechanisms activate and undergo intramolecular hydrogen abstraction reactions but only with itself and therefore is not a type II photoinitiator. Type II photoinitiators involve biomolecular reactions as indicated by page 33 **(item 4)** of the aforementioned book reference also attached herewith.

Kraemer employs acetophenone in numerous examples and also identifies this as a preferred photoinitiator. Attached page 73 from the above mentioned book reference which indicates that acetophenone is insufficiently reactive for photo curing technology and therefore is not considered a type II photoinitiator **(item 3)**.

Therefore since the photosensitisers of Kraemer are not limited solely to type II photoinitiators there is nothing to indicate to the skilled person that the reference at column 10, lines 65 to 66 is specifically

intended to only apply to type II photoinitiators. Therefore there is no particular reason why the skilled person should select the specific photosensitisers of Kraemer that happen to be type II photoinitiators.

In fact when considering the polymeric surfactants of the Holland reference the skilled person is more likely to be motivated by a process which leads to a more effective product (a surfactant or amphiphilic polymer for example).

In the paragraph of column 3, lines 23 to 43 of Kraemer a possible mechanism is proposed. It would appear that Kraemer considers his process works because the polypeptide is hydrophilic and that as a rule the carrier substances used is also hydrophilic so that there is an exchange effect and mutual arrangement with hydrophilic groups of the polypeptide. Kraemer appeared to consider that the hydrophobic photochemically active groups of both macromolecules are necessarily brought into proximity and their reaction is facilitated. The hydrophilic nature of the carriers are also indicated in column 4 of Kraemer. Since Kraemer has emphasised that the mechanism of his grafting process requires that both the polymeric carrier and polypeptide to be hydrophilic, the skilled person would question the applicability of such a mechanism to the preparation of a polymeric surfactant which by definition requires that one component is hydrophobic whilst the other component is hydrophilic. This is because surfactants by definition contained hydrophilic moieties and hydrophobic moieties. Consequently, the skilled person is more likely to consider that the grafting process of Kraemer using the photosensitisers is irrelevant to the preparation of surfactants.

Applicants bring example 3 of the present application to the examiner's attention which compares the surfactant properties of castor oil polyvinylpyrrolidone copolymer prepared using the grafting process of the present invention with type II photoinitiator against a grafted product prepared using a thermal free radical polymerisation. The results demonstrates that the product of the invention exhibites surfactant properties by its ability to emulsify a water toluene mixture compared to the conventionally produced product which exhibited no surfactant properties.

This could not have been predicted from the Kraemer reference. Therefore the process of claim 11 is not rendered obvious over Holland in view of Kraemer.

With regard to the rejection of claims in 11 and 13 based on Kud US 4846995 in view of Kraemer as this rejection is very similar to the one above based on Holland in view of Kraemer.

Kud refers to the preparation of compounds such as greyness inhibitors, which may be regarded as surfactants, by conventional grafting of monomers onto a PEO backbone. Kraemer is used again to supply information about type II photoinitiators.

While Kraemer does list various type II photoinitiators, he also lists numerous other types of photoinitiators. One skilled in the art has no particular direction to choose specifically type II photoinitiators. Certainly, the motivation the examiner cites (faster reactions and ability to stop the reaction on demand) are suspect based on the full context of Kraemer.

Further, since Kraemer has emphasised that the mechanism of his grafting process requires that both the polymeric carrier and polypeptide to be hydrophilic, the skilled person would question the applicability of such a mechanism to the preparation of a polymeric surfactant which by definition requires that one component is hydrophobic whilst the other component is hydrophilic.

Additionally, present example three indicates that replacing a thermal initiator with a photoinitiator of type II in the presently claimed grafting process gives a polymeric product capable of emulsification. The same reactants when treated with a thermal free radical give a gelled polymerization product. Hence the invention is not rendered obvious over Kud in view of Kraemer.

Reconsideration and withdrawal of the rejection of claims 11 and 13 is respectfully solicited in light of the remarks and amendments *supra*.

Since there are no other grounds of objection or rejection, passage of this application to issue with claims 11 and 13 is earnestly solicited.

Applicants submit that the present application is in condition for allowance. In the event that minor amendments will further prosecution, Applicants request that the examiner contact the undersigned representative.

Respectfully submitted,

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Enclosures: Index page from the book volume III, Photoinitiators for Free Radical Cationic and Anionic Photo-polymerisation, Second Edition, Chemistry and Technology of UV and EB Formulation for Coatings, Inks & Paints by Prof. J. V. Crivello and Dr. K. Dietliker **(Item 1)**, Page 186 of the same book teaching the photochemistry of methyl phenylglyoxylate **(item 2)**, Page 73 of the same book which teaches that acetophenone derivatives are not sufficiently reactive for use in photocuring **(item 3)**, Page 33 of the same book teaches that type II photoinitiators involve biomolecular reactions **(item 4)**.